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## AQUAMESH - Fiber Optic Alarmed Underwater Security Barrier

**Background.** Pilkington P.E. Limited, United Kingdom, has developed and is marketing an underwater fiber optic alarmed security barrier. The system is designed to deter, delay, and detect any intruder or intrusions into a restricted area. Additionally, the system has a high probability of detection and a low false alarm rate.

**Description.** The physical security barrier is available in options that include a composite net comprising a webbing structure and fiber optic mesh. This material is deployed along floating or free-standing structures, buoys, or seabed foundations.

The total arrangement comprises a number of fiber optic panels, which can be linked to form any number of alarm zones. This will enable identification of the area of an intrusion or multiple intrusions. The fiber optics comprising the panels are connected via optical fiber communications cables to electronic control units.

From currently available production materials, a 4.8-mm diameter U.V. resistant, reinforced cable is assembled into a sensor net that cannot be entered by intelligent attack; i.e., attempts to unweave the structure or disconnect the panel junction areas. The proposed cable is flexible, strong, and nonelastic.

The cable is also intended to delay attempts to cut through the net. There are Kevlar and steel cores to the cable, the objective being to delay cut-through with either cutters or blade; i.e., cutters will tend to crush/clog on Kevlar and the stainless steel wire will resist knife attack. An attacker would need to make several cuts to enable entry through the net and the accumulated post-alarm delay will help the security forces to respond.

The system is designed to enable simple installation and repair with a minimum of underwater tasks. Panels are prefabricated ashore and thus the main underwater operation to be performed is seabed fixing and threading the cojoin security cables between

panels. To repair or maintain, the panel is removed and replaced with a spare. Then work is done ashore.

Fiber optics provide benefits and advantages over alternative technologies and materials because the fiber optic cable cannot be bridged or broken without detection. The net is configured to defeat attempts to unweave the structure without detection. The panel jointing component also carries an alarmed fiber optic cable so attempts to cut the cojoin will be detected.

Extremely low false alarm rates result because fiber optic sensors will only alarm when the fiber is broken and, as such, are not affected by environmental changes, static charges, vibration, magnetic field, radio frequencies, or sonar.

The sensor net carries only light pulses so it cannot short circuit, spark, or overheat and requires only low power. The alarm signal is transmitted through fiber optic cables from the net to remote electronic controls, and it can therefore pass safely through hazardous areas. At the same time, the signals are free from interference from adjacent power cables or other electrical/radio/radar equipment and is also secure from tamper.

**For further information** contact Barry Griffiths, General Manager, Pilkington Security Systems, Rhyl Road, Denbigh, Clwyd, North Wales, U.K. LL16 5TA. Telephone (745571) 4771, Telex 617156, FAX (745571) 5933.

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